



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US97/11208 (22) International Filing Date: 24 June 1997 (24.06.97) (30) Priority Data: 08/672,618          28 June 1996 (28.06.96)          US (71) Applicant: SHAW, Robert, Francis [US/US]; 2330 Marinship Way, Sausalito, CA 94965 (US). (72) Inventor: HUNZIKER, Ernst, B.; Sonnenrain 32, CH-4533 Riedholz (CH). (74) Agents: HALEY, James, F., Jr. et al.; Fish & Neave, 1251 Avenue of the Americas, New York, NY 10020-1104 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>  (88) Date of publication of the international search report: 12 February 1998 (12.02.98)	
(54) Title: METHODS AND COMPOSITIONS FOR THE TREATMENT AND REPAIR OF DEFECTS OR LESIONS IN CARTILAGE OR BONE USING FUNCTIONAL BARRIER			
(57) Abstract  <p>Methods and compositions are provided for the treatment and repair of defects in the cartilage or bone of humans and other animals as in full-thickness defects in joints. To induce cartilage formation, a defect in cartilage is filled with a matrix having pores sufficiently large to allow cartilage repair cells to populate the matrix. The matrix contains an anti-angiogenic agent that serves as a functional barrier to prevent vascularization and bone growth into the cartilage area. The matrix filling the defect in cartilage may also contain a proliferation agent and a chemotactic agent, and a transforming factor in an appropriate delivery system. A functional barrier between the bone and cartilage areas of a full-thickness defect may also be created by heat-treating the areas of bleeding to form a transient tissue barrier which prevents blood vessels and associated cells from penetrating from the bone area into the cartilage area. If desired, the bone portion of the full-thickness defect may be filled with a matrix having pores large enough to allow cells to populate the matrix and to form blood vessels. The matrix filling the bone defect may contain an angiogenic factor and an osteogenic factor in an appropriate delivery system. Methods and compositions are also provided for assisted bone and connective tissue regeneration for dental and other applications.</p>			

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 97/11208

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61L25/00 A61L27/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 03036 A (ANGIOGENESIS TECH INC ;BURT HELEN M (CA); HUNTER WILLIAM L (CA); M) 2 February 1995 see claims ---	1-37
X	US 5 382 514 A (PASSANITI ANTONINO ET AL) 17 January 1995 see the whole document ---	1-37
Y	WO 92 10210 A (DU PONT) 25 June 1992 see claims; examples ---	1-37
Y	EP 0 530 804 A (SHAW ROBERT F) 10 March 1993 see claims & US 5 270 300 A cited in the application ---	1-37
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

19 November 1997

Date of mailing of the international search report

16.12.97

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# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 97/11208

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 92 13565 A (SHAW ROBERT F) 20 August 1992 see the whole document ---	1-37
A	EP 0 495 284 A (OSTEOTECH INC) 22 July 1992 see claims ---	1-37
A	EP 0 637 450 A (COLLAGEN CORP) 8 February 1995 see examples 1-6 ---	1-37
A	WO 95 22316 A (MARX GERARD) 24 August 1995 see claims; examples -----	1-37

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/11208

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1-22, 37  
because they relate to subject matter not required to be searched by this Authority, namely:  
Remark: Although claim(s) 1-22, 37 are directed to a method of treatment of (diagnostic method practised on) the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/11208

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Information on patent family members

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PCT/US 97/11208

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